Ohio Smart Mobility Initiative

Carla Bailo

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The Center for Automotive Research (CAR) is the pre-eminent research center in sustainable and safe mobility in the United States and an interdisciplinary research center in The Ohio State University’s College of Engineering.

**RESEARCH:**
- Fuel Economy
  - Hybrid and Electric Powertrains
  - Improving Conventional Vehicles
  - Vehicle Emissions
- Intelligent Transportation Systems
  - Automated Driving
  - Connected Vehicles
  - Crash Imminent Safety UTC
- Safety
  - Advanced Vehicle Safety
  - Pedestrian and Vehicle Safety Research
- Sustainable Mobility
  - Alternative Fuels
  - Smart Cities
  - Vehicle to Building Interaction
Control and Intelligent Transportation Research Lab (CITR)

OVERVIEW: CITR provides basic research in addition to a range of experimental, testing and validation, and demonstration capabilities applicable to Intelligent Transportation Systems (ITS). These include pure simulations, experiments in a laboratory setting with scale-model robotic platforms, and full-scale demonstrations involving multiple vehicles.

FACILITIES:
- The Indoor Testbed
- The Outdoor Testbed
- CAR West Garage
- The Mechantronics Lab
UTC STRATEGIES:

1. Improve the interaction of the driver with an autonomous vehicle system to avert or minimize the impact of crashes.

2. Develop standard simulation/verification models to effectively understand human behavior and pre-crash safety over a wide range of autonomous vehicle properties and behaviors.

3. Use human behavior data across such variables as age, physical size, or alcohol intake, to inform the actions of the driver in pre-crash scenarios.

4. Include policy and regulation considerations early in the R&D process in order to accelerate turning research outcomes into widespread practice.
TRANSPORTATION RESEARCH CENTER (TRC)

TRC is an independent automotive proving ground providing research and development, and compliance and certification testing for vehicles and components, for crash testing, emissions testing, dynamic testing and durability testing.

- 4,500 acres of land in East Liberty, OH
- Operates 24/7
- Impact Laboratory
- Emissions Laboratory
- Durability and Dynamic Testing
**Vision**: Ohio leads the nation and world in the development of smart mobility and smart city technologies that have major impact on Ohio transportation industry and creates thousands of new jobs.

**Plan**: OSU leads team of TRC, Inc., City of Columbus, and local governments to create a workforce development, technology demonstration, and commercialization program of high impact.

**Why**:

- Area of critical need for the nation experiencing rapid technological innovation
- High level of local expertise
- Priority area for OSU growth
- Outstanding facilities to leverage
- Ohio history of excellence in transportation industry
Technology Areas

- Advanced Driver Assistance Systems (ADAS) and Autonomous Vehicle (AV) systems development
Technology Areas

- Infrastructure development: “smart” interactions with ADAS and AV
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Technology Areas

• Data Analytics
  • Data collected and stored by vehicles and infrastructure used to improve mobility and efficiency
  • Cybersecurity a major issue and research focus
Technology Areas

- **Environment** – carbon footprint reduction
  - Platooning for fuel economy and logistics optimization
- **Capacity** – roadway usage efficiency and reduced traffic congestion
- **Safety** – accident avoidance
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Technology Areas

- Autonomous wheelchairs and autonomous transport of the elderly and disabled
Technology Areas

- Food security/transportation
  - Local food to market: improved efficiency, reduced carbon footprint, improved food safety
  - “Smart” appliances and Internet-of-Things connectivity with transportation and delivery
Technology Areas

• Artificial intelligence, ethics, and moral decision making
  • Testbed for assessing decision making and policies
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Workforce Development

• OSU to lead program of student preparation for “smart mobility” careers
  • Engineering, city and regional planning, public policy, economics
  • Programs for both Columbus and regional campuses

• Training will focus on rulemaking, algorithm improvement, smart mobility technologies

• Jobs will exist in Ohio to match student career aspirations
Workforce Development

- Partnerships with other local and regional universities
  - Wright State University, Ohio University
  - Carnegie Mellon
  - U of Michigan
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Potential Outcomes

• Transportation efficiency and sustainability
  • More efficient roadway use

Transportation Greenhouse Gas Emissions, by Source

2009 U.S. Transportation Energy Use by Mode (EIA data)

• “Right sizing” means of transport
• Reduced aggregate fuel consumption
• Air pollution minimization
Potential Outcomes

- Sustainable Economy Impact
  - Efficient transportation of goods and reduced transport costs
  - “Car sharing” (e.g. Uber) efficiency impacts

- Job Creation
  - New markets for smart mobility technologies of Ohio industry
  - Infrastructure management
  - “Smart vehicle” management/programming
  - US-33 additional growth in the high-value, technology-oriented, and automotive supply chain jobs with the associated private capital investment Smart Corridor. Further, expansion of hospitality service (hotels, restaurants, etc)
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**Partner Impacts**

- **Transportation Research Center, Inc. (TRC)**
  - Revitalizes TRC business case for potential customers
  - Opens door for increased business at TRC
  - Ensures that NHTSA will stay onboard
  - Honda enabled to conduct advanced engineering development in Ohio
  - Top student talent stays in Ohio vs. going to Silicon Valley
- **City of Columbus**
  - Job Creation: Brings/Grows high tech companies and their jobs for Columbus
  - Ancillary jobs needed due to employee growth and business visitors
  - Builds on Columbus’s “intelligent city” concept
  - SPARC (former Cooper Stadium site) growth as mobility test bed
- **US -33 Corridor**
  - Strengthens “intelligent cities” concept from Columbus through East Liberty
  - Job creation in the high-value, technology-oriented, and automotive supply chain to manage this network
  - Job creation for services for increased business travelers (hotels, restaurants, shopping, etc)
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STAKEHOLDER DISCUSSIONS TO DATE

- City of Ann Arbor
- City of Columbus
- City of Marysville
- Union County

- I-75
- I-76
- I-80/90 Turnpike
- I-94
- US-33

- Carnegie Mellon
- Columbus2020
- JobsOhio
- Rev1 Ventures
- TRC
- M-City
- MORPC
- MDOT
- ODOT
- PennDOT
- The Ohio State University
- University of Michigan

INDUSTRY PARTNERS

- Automotive OEM’s
  - Passenger
  - Heavy Duty
  - Tier 1 Suppliers to Auto Industry

- USDOT
  - NHTSA

- State of Ohio
  - Legislature
  - Governor’s Office

UNIVERSITIES

GOVERNMENT ENTITIES
THANK YOU!